

What is claimed is:

1. In an electronic camera comprising an operation unit having a display unit and an image capturing unit provided with a flash unit and a photographic zoom lens, the image capturing unit connected rotatably by a hinge mechanism and transmitting an image signal to the display unit, an image capturing apparatus which is characterized in that an outer diameter of the lens is defined to a thickness of the display unit disposed on the operation unit, a memory, a battery and a control circuit board, a casing is supported on a lens frame through which a guide shaft is pierced so as to move the lens back and forth, and a cam for moving the zoom lens is disposed at the side of a lens system so that camera is made thinner.
2. An image capturing apparatus according to claim 1, wherein the image capturing unit is provided with a flash unit on the side of the operation unit of a photographic window, the low part of the accepting portion of the flash unit is made thinner than the side of said photographic window, the display unit of the operation unit is disposed on the side of the image capturing unit and operating buttons are disposed on the opposite side of the image capturing unit of the display unit.
3. An image capturing apparatus according to claim 1, wherein a thickness of the image capturing unit along a direction of lens optical axis at the portion where the flash unit is disposed is approximately a thickness of a finger, and a distance between the side end of the photographic window and the side end of the portion where the flash unit is disposed is a distance between a tip of a finger and near a second arthrosis of the finger so as to be able to rotate by holding a flared portion with two fingers.
4. An image capturing apparatus according to claim 1, wherein a distance between a side of the photographic window and the center of rotation of the hinge mechanism in the image capturing unit is such that visibility of the display unit is not hindered by the portion where the flash unit is disposed when the side of the photographic window of the image capturing unit is rotated to the side of the display unit.

5. An image capturing apparatus according to claim 1, wherein the image capturing unit comprises an optical system unit having a lens barrelless lens mechanism part with a zoom lens and a focus lens and a driving mechanism part in which a zoom lens driving mechanism and a focus lens driving mechanism are built integrally, and an optical system installed part in which the optical system unit is installed by shielding light, wherein the operation unit and the image capturing unit are formed as thin box-like bodies of the approximately same thickness.

6. An image capturing apparatus according to claim 1, wherein the image capturing unit comprises an optical system unit having a lens barrel less lens mechanism part with a zoom lens and a focus lens and a driving mechanism part in which a zoom lens driving mechanism and a focus lens driving mechanism are built integrally, and an optical system installed part in which the optical system unit is installed by shielding light wherein a circuit board is disposed adjacently to a side of the optical system unit and a main condenser is disposed adjacently to a back of the optical system unit.

7. An image capturing apparatus according to claim 1, wherein the image capturing unit comprises an optical system unit having a lens mechanism unit with a zoom lens and a focus lens and a driving mechanism unit in which a zoom lens driving mechanism and a focus lens driving mechanism are built integrally, the optical system unit being provided with a lens frame of the zoom lens, a lens frame of the focus lens and a guide shaft, wherein the guide shaft guides both of the lens frame of the zoom lens and the lens frame of the focus lens.

8. An image capturing apparatus according to claim 1, wherein the image capturing unit comprises an image capturing element, a holding member which holds the image capturing element, a fixing frame having a standard plane to position the holding member and an elastic member disposed on the fixing frame wherein the image capturing element is positioned and fixed on the fixing frame by pressing the holding member on to the standard plane with the elastic member.

9. An image capturing apparatus according to claim 1, wherein the image capturing unit further comprises an image capturing element, a holding member which holds the image capturing element, a fixing frame having a standard plane to position the holding member, an elastic member disposed on the fixing frame, a holder, a mask, a filter having an optical property of LPF and a rubber having elasticity wherein the image capturing element is held with the holding member by pinching the image capturing element, the rubber, the filter and the mask with the holding member and the holder.

10. An image capturing apparatus according to claim 1, wherein the image capturing unit further comprises an image capturing element, a holding member which holds the image capturing element, a fixing frame having a standard plane to position the holding member, an elastic member disposed on the fixing frame, a holder, a mask, a filter having an optical property of LPF, a rubber having elasticity, flange portions provided at both ends of the holding member, each flange portion having a fixing hole for positioning, and a fixing prong corresponding to the fixing hole provided in the vicinity of the standard plane, wherein the elastic member is a leaf spring provided corresponding to the fixing prong and the image capturing element is positioned and fixed on the fixing frame by fixing the fixing prong to the fixing hole and by pressing and fixing the flanged portion with the leaf spring.

11. In a cam apparatus having first and second spiral cam grooves for moving an object with a cam-driving force which is generated by cam-driving a cam groove inserting member inserted in each cam groove, a cam apparatus comprising:

a cam base body in which sliding portions having a smaller diameter than that of a middle portion of a cylinder are formed at both ends of the cylinder, an approximately vertical plane of a stepped portion between one sliding portion and the middle portion of the cylinder is defined as one cam plane of the first cam groove and an approximately vertical plane of a stepped portion between the other sliding portion and the middle portion of the cylinder is defined as one cam plane of the second cam groove;

a first cam frame having another cam plane confronting the one cam plane of the first cam groove and provided non-rotatably so as to be able to slide on one sliding portion;

a second cam frame having another cam plane confronting the one cam plane of the second cam groove and provided on the other sliding portion non-rotatably so as to be able to slide; and
a forcing device which contacts a cam groove inserting member which is inserted to the cam groove formed by the first and the second cam frames and the cam base body on to the cam plane by pressing the first and the second cam frames.

12. A cam apparatus according to claim 11, further comprising an adjusting mechanism which adjusts a distance between the one side planes of the first and the second cam grooves.

13. A cam apparatus according to claim 11, wherein a slope is provided on at least one cam plane of the one cam plane and the other cam plane, the slope is a slope which gives a cam driving force along a direction of the rotational axis of the cam groove and pushing force along a direction orthogonal to the direction of the rotational axis of the cam groove to the cam groove inserting member.

14. A cam apparatus according to claim 11, wherein a forcing device for fastening to tighten one end of the forcing device to the first cam frame and another end to the second cam frame and a forcing device for pressing the first and the second cam frame to the cam base body along one direction.

15. An optical zoom mechanism comprising:

a zoom lens;

a holding frame which holds the zoom lens;

a rotational axis rod having gears at the both end thereof;

a first group of rate reducing gears which engage the gear at one end of the rotational axis rod;

a second group of rate reducing gears which engage the gear at another end of the rotational axis rod;

a motor which drives the second group of rate reducing gear; and

a cam body driven by the first rate reducing gears,

wherein the zoom lens is driven by inserting a cam groove inserting member provided on the

holding frame into a spiral cam groove of the cam body, the cam body comprises one cam body which forms one cam plane and another cam body which forms another cam plane, which is provided non-rotatably so as to be able to slide and which forms another cam plane confronting the one cam plane, and the cam body further comprises a forcing device which contact the cam groove inserting member to the cam plane by pressing one cam body and/or another cam body, whereby zooming is performed by moving the holding frame with the cam body.

16. An optical zoom mechanism according to claim 15, wherein the cam body comprises:
a cam base body having a first spiral cam groove, a second spiral cam groove, a sliding portion having a smaller diameter at both ends of a cylinder, one cam plane of the first cam groove which is provided at a stepped portion between one sliding portion and the middle portion of the cylinder, and one cam plane of the second cam groove which is provided at a stepped portion between another sliding portion and the middle portion of the cylinder;
another cam plane confronting the one cam plane of the first cam groove;
a first cam frame provided non-rotatably so as to be able to slide on the one sliding portion;
another cam plane confronting the one cam plane of the second cam groove;
a second cam frame provided non-rotatably so as to be able to slide on the other sliding portion;
and further
a forcing device which contact a cam groove inserting member to the cam plane by pressing the first cam frame and the second cam frame, the cam groove inserting member inserted into two cam grooves which formed with the first cam frame, the second cam frame and the cam base body.